



Fenced but not forgotten

**A guide to the ongoing
management of
conservation areas**





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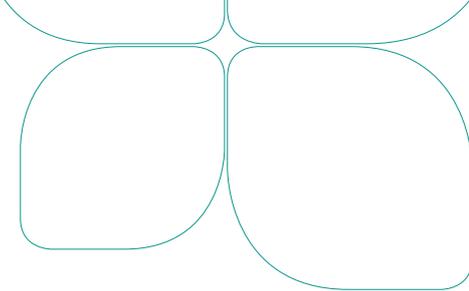
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Introduction

The first step to conserving native vegetation and habitat is often to fence off the vegetation so that the area can be managed as a separate unit and grazing can be controlled.

While protective fencing is important, it is not a simple case of 'fence and forget'. Having a fence in place will not necessarily mean that the health of the conserved area improves. Active management will be required to maintain or improve the condition of the native vegetation and habitat.

This guide assists landholders to determine the most appropriate management actions that will help to protect and enhance native vegetation and habitat conservation areas on their property. This guide also provides general information on how to implement these actions and suggests some simple monitoring techniques that landholders can adopt.

What management does my conservation site need?

Due to human interference and disturbance in the past, the majority of conservation areas will require some level of ongoing management. In general, the higher the level of disturbance in past, the poorer the condition of the vegetation and habitat and more time, effort and resources will be required to fix it. However, even 'intact' sites (close to their original state) require ongoing monitoring and management to maintain their condition.



This box woodland is in poor condition. There is minimal groundcover and poor plant diversity. It will require a high level of management to restore the ground layer. Management actions that may be required include temporary grazing exclusion, weed control, retention of fallen timber and debris and, after the groundcover has recovered, strategic grazing to encourage plant diversity.



This grassy box woodland is in good condition. It has good groundcover and plant diversity. Any existing management actions such as weed control and grazing management should be continued to ensure it remains in this (or better) condition.



Fencing is often just the first step to conserving native vegetation and habitat. Ongoing, active management is required to maintain or improve the condition of the native vegetation and habitat.

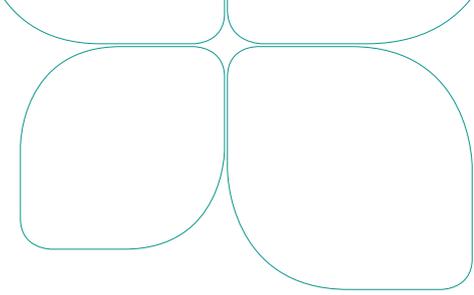
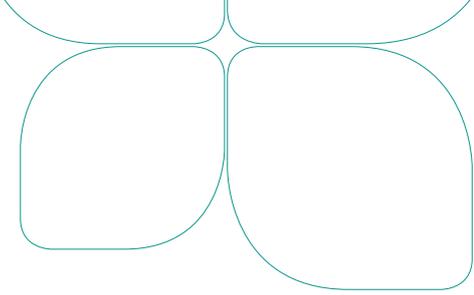


Table 1 suggests management actions to address various issues that you may identify within your conservation area. You may need to do some or all of the management actions before you start to see any improvement in the condition of the site. More detail on how to implement some of the management actions is provided later in this guide.

Table 1. Signs of impact in conservation areas and suggested management actions.

Sign of impact	Management actions
Grazing pressure	<ul style="list-style-type: none"> • Fence the area so that grazing can be managed. • Reduce grazing pressure by excluding or controlling stock access and managing pest animal species. • Allow native plants to fully recover between grazing events by 'resting' the site for longer periods.
Poor plant health	<ul style="list-style-type: none"> • Avoid spray drift and fertiliser application, particularly if aerial spraying. • Encourage natural predators of mistletoes and insects. • Encourage regeneration or revegetate to ensure there are young plants to replace those that die. • Consider enlarging the conserved area to create a core area that is less exposed.
Poor native plant diversity	<ul style="list-style-type: none"> • Exclude fertiliser. • Encourage natural regeneration. • Reduce grazing pressure to allow native plants to regenerate. • Strategically graze to encourage plant diversity. • Thin over-abundant regeneration (with approval). • Apply low intensity, infrequent, mosaic burns (with approval). • Revegetate moderately or highly degraded areas, where regeneration is not effective.
Poor native animal diversity	<ul style="list-style-type: none"> • Retain dead trees and fallen timber, avoid firewood collection. • Restore habitat by incorporating features such as logs, leaf litter and nest boxes. • Control invasive animals. • Encourage regeneration of native overstorey, understorey and groundcover or revegetate using local native species. • Encourage habitat and plant diversity. • Consider enlarging the area or connecting it to other remnant vegetation through wildlife corridors.
Invasive animals	<ul style="list-style-type: none"> • Control pest species by using integrated methods and managing pest harbours.
Invasive plants	<ul style="list-style-type: none"> • Control (in order of priority) WONS, regionally significant perennial weeds, and other perennial and annual weeds using integrated methods. • Encourage regeneration of native perennial plants to compete with weeds. • Strategically graze the area to prevent weeds reproducing by seed. • Clear and manage invasive native scrub (with approval). • Encourage natural predators of mistletoe.
Land degradation	<ul style="list-style-type: none"> • Stabilise erosion, using earthworks where necessary. • Reduce grazing pressure and control stock access to eroded or scalded sites. • Plant or maintain perennial vegetation on recharge sites and carefully manage discharge sites to reduce the impact of salinity. • Encourage regeneration or establish groundcover. • Direct seed or plant.
Poor water quality	<ul style="list-style-type: none"> • Control stock access to water bodies. • Stabilise erosion. • Avoid overuse of chemicals and fertilisers on adjacent land. • Adopt conservation farming and grazing methods on adjacent land. • Establish vegetation 'buffers' around water bodies.
Aboriginal cultural heritage	<ul style="list-style-type: none"> • Consult with the local Aboriginal community to determine the best way to manage Aboriginal heritage sites.
Unwanted visitors	<ul style="list-style-type: none"> • Consider putting locks on gates and erecting signs as a deterrent.
Damage from natural events	<ul style="list-style-type: none"> • Check fence lines and repair (if damaged) to ensure they remain stock-proof.



Prioritising management actions

It may not be possible (both physically and financially) to undertake all of the required management actions at once. Some ideas to help you prioritise management actions are included in this section.

If there does not appear to be any immediate threats and it is unclear as to what you should do first, it may be best to simply monitor the site for a while until you become more familiar with it and can determine what is needed. Your Local Land Services Officer may also be able to help you to decide the best course of action.

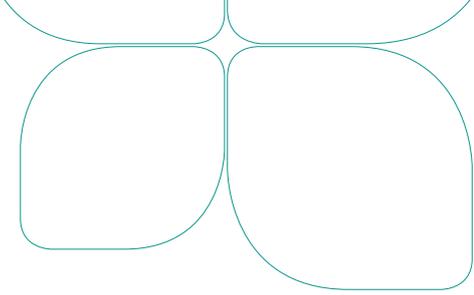
Preserve the good aspects first, then restore degraded areas

Concentrate your efforts on preserving as many of the good, existing features within your conservation area as possible and then tackle the more degraded areas, which will require more time and

effort. Exceptions to this rule may be if there is a particular threat within the conservation area.



Your priority for management should be to preserve any existing native vegetation and habitat and manage any threats to these areas such as invasive plants or animals. Then address degraded areas that require more time-consuming and costly restoration works.



Zero or low-cost actions

Some management actions such as retaining fallen timber, excluding fertiliser and, in some cases, excluding stock are 'no cost' activities that can easily be achieved.

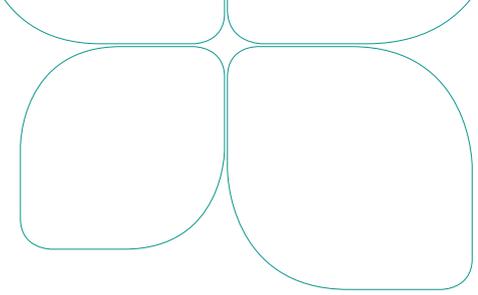


Why not start by doing some management actions that require you to do nothing! Retaining fallen timber will benefit wildlife and help nutrient cycling.

Other management actions have low-cost alternatives that you should attempt before considering more costly approaches. For example, encouraging natural regeneration is a relatively low-cost method as opposed to planting new vegetation.



Encouraging native plants to regenerate is cheaper, easier and often more successful in the long term, than revegetating. Photos: Mikla Lewis.



Don't ignore immediate threats

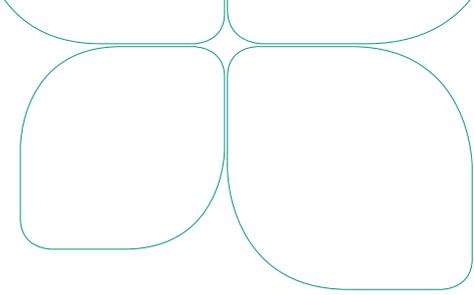
Are there things posing an immediate threat to the health of the conservation area? These threats have the potential to quickly degrade the site and, if not addressed soon, may significantly increase the time, effort and money required to fix them. Examples include major pest animal or perennial weed problems and gully erosion.



*From this photo, it is clear that action should have been taken to address erosion issues prior to undertaking other works such as revegetation.
Photo: Mikla Lewis.*



Don't ignore issues such as active erosion or pest problems, which only become more difficult and costly to fix, the longer you leave them. Photo (top): Mikla Lewis.



Get the grazing regime right

Getting the grazing regime right is one of the most effective management tools you can master. Strategic grazing can help you to control weeds and encourage regeneration and plant diversity, which will have flow-on benefits that may solve some of the other problems within your conservation area.



Limiting grazing in your conservation can provide immediate results, especially in the ground layer.

What do you want to achieve?

What do you want to achieve with your conservation area? Do you simply want to preserve the vegetation that is there or are you wanting to restore the natural

integrity of the area to its near-original state? Are you wanting to use the area for production such as grazing? Do you want to actively encourage threatened species to utilise the area? The answers to questions like these will help to determine the level of management you undertake.



Bush stone-curlew

If you have a specific purpose for your conservation area, such as the preservation of habitat for a threatened species, you should concentrate your efforts on aspects that will help you to achieve that purpose. Photo: Milton Lewis.

Work in manageable areas

If your conservation area is large, you may need to just concentrate on one small part of it at a time for intensive activities such as weed control.

A photograph of a fenced-in area with trees and grass. The fence is made of wire mesh supported by wooden posts. In the background, there are several large, leafy trees under a clear blue sky. The foreground shows dry, brownish grass. A teal-colored shape is overlaid on the bottom left of the image, containing the text 'Management actions' in white.

Management actions

Management actions

Grazing management

Grazing is often the main factor inhibiting the natural regeneration of native vegetation. By fencing off remnant vegetation, grazing can be controlled, allowing natural regeneration to start again.

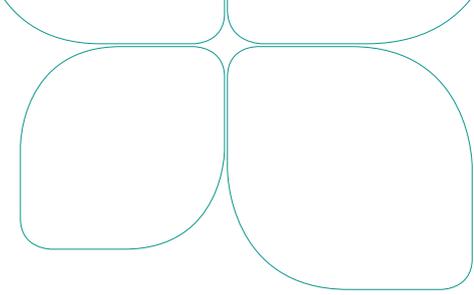


Temporarily excluding stock provides an opportunity for native trees and shrubs to regenerate. Photo: Mikla Lewis.

In some cases, you may need to exclude stock altogether or at least allow longer periods of recovery. For example, sites with poor soils that are prone to erosion may require very careful management to establish and maintain groundcover.



A heavy rainfall event has caused erosion within this conservation area. Careful management of the eroded area is required. This includes excluding stock until the erosion has been stabilised. Photo: Mikla Lewis.



Conservation areas can be strategically grazed. They also make excellent, short term lambing paddocks when the weather is inclement. Photos: Mikla Lewis.

In most cases, fencing does not necessarily mean locking the area up—you may be able to tailor the management of the area to meet the needs of the vegetation and wildlife as well as meet production goals. In fact, grazing is often necessary to encourage plant diversity and growth, provided it is strategically managed.

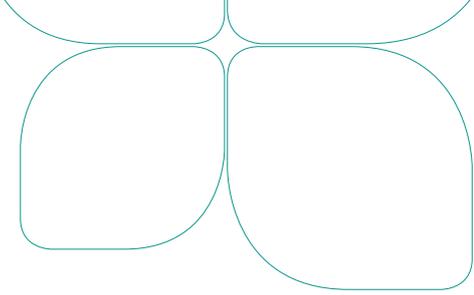
A pattern of intense grazing (high number of animals) for short periods of time, followed by long rest periods is generally better for native vegetation than constant grazing. In general, grazing should only remove one third of the plants foliage and stock should not be returned until the plants have fully recovered.

Stock should be excluded when native species are flowering and setting seed (generally spring through summer).



Excluding stock when native plants are seeding will allow the plants to regenerate. Photo: Mikla Lewis.

Don't forget to regularly check the condition of fence lines and maintain them in a stock-proof condition.



A simple way to assess groundcover is to randomly select sample areas (by throwing the hoop) and calculate the percentage of groundcover within the hoop, then calculate an average across all the sample sites. Photo: Mikla Lewis.



Groundcover plants should be allowed to fully recover in between grazing events.



Undertaking groundcover and feed availability assessments will help you to determine when and for how long you should graze a site. Photo: Mikla Lewis.



Make sure that you account for all grazing animals—domestic, introduced and native—when assessing grazing pressure. Photo: Vazquez Vincent.

Managing invasive species

Controlling invasive plants and animals in conservation areas is a job that should not be put off. Many of the problems associated with pest species arise from their ability to reproduce rapidly. Left unmanaged, population numbers can quickly rise, making control more difficult and costly. Any declared pest species need to be controlled in accordance with the Local Land Services Act 2013 and Noxious Weeds Act 1993.



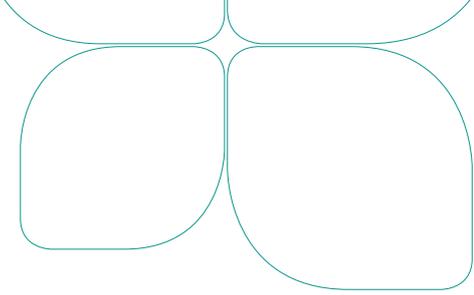
Feral pigs

Controlling invasive species can significantly improve the health of conservation areas. Photo: Mikla Lewis.

The first step in controlling invasive species is to undertake some monitoring. You need to determine what species are present and if their numbers are increasing or if they pose an immediate threat to the vegetation, habitat features or wildlife within the conservation area. If so, you will then need to plan and implement a control program for each pest species.



Look for signs of invasive animals and plants in your conservation area and try to determine the size of the population so that you can plan an appropriate control program. Photo: Mikla Lewis.



Steps should also be taken to prevent or deter new weed or pest animal populations from invading your conservation area.

It will be near-impossible to completely eradicate weeds and pest animals from your conservation area. Weed seed can remain dormant in the topsoil for years and can easily be blown, washed or carried in. Pest animals can move freely through the landscape and take up residence in your conservation area.

Follow-up inspections and control is essential to keep on top of any invasive species. The task of controlling invasive plants and animals can be daunting and expensive. Intricate knowledge of plant and animal biology and control methods is often required. It may be helpful to discuss any pest control issues with your Local Land Services Officer.

All pest control activities should be conducted in accordance with relevant legislation such as the Local Land Services Act 2013, Noxious Weeds Act 1993, Pesticides Act 1999 and Prevention of Cruelty to Animals Act 1979.

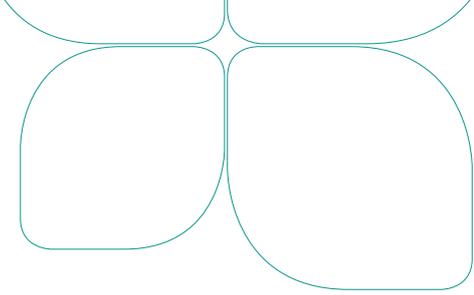
Invasive animals

Feral animals

Control programs should be implemented across the property (not just within the conservation area), and are most effective when coordinated with control activities on neighbouring properties.



Foxes can have large territories and often travel large distances in search of food. To increase the effectiveness of control efforts, coordinated baiting programs should be undertaken across neighbouring properties.



For most feral animal species, integrated pest control programs that utilise a variety of methods work best. This often involves an initial broadscale reduction in population numbers followed by more targeted control.

Methods of control may include:

- shooting (both aerial and on-ground)
- poisoning (1080, pindone)
- trapping
- mustering
- harbour destruction.

Feral pigs

Feral pigs are best controlled using a two-phase method. The initial control may involve a broadscale poisoning program. Poisoning involves 'free feeding' (feed without poison) the pigs until the majority of the pigs are feeding well. Poison (1080) is then introduced to the feed and will affect a large percentage of the population.



'Free feeding' feral pigs prior to baiting

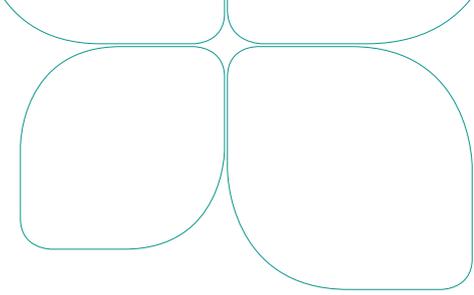


A hog hopper, used for baiting feral pigs.

Baiting should be followed up with targeted shooting or trapping. Commercial pig traps are available or simple traps can be made using silo mesh.



A pig trap constructed using silo mesh. Grain is trickled into the enclosed area through a trap door.



Feral goats

Feral goats may be mustered, providing not only environmental benefits but a return from the animals if they are sold. Where water is limited, it may be possible to trap goats around watering holes using specialised fencing. Shooting may also be an option for control, particularly if it can be done from the air.



An aerial goat shoot. Tip: shoot the male goats first as the females will mill around. Then shoot the black or darker goats, which are harder to see in the landscape. Photo: Angela Lonegran/ OEH.

Rabbits

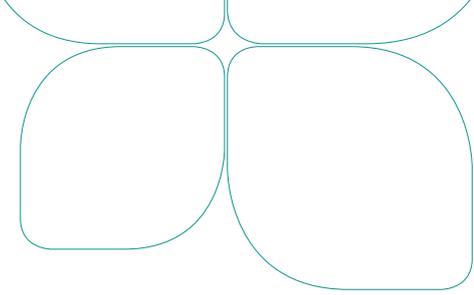
While there is some level of rabbit control through rabbit haemorrhagic disease (also known as calicivirus) and myxomatosis outbreaks, these viruses should not be entirely relied upon to control rabbit populations. The most effective way to control rabbits is to remove or destroy rabbit harbours.

Poisoning programs (using 1080 or pindone) conducted during the non-breeding season can also be effective, even in reducing large populations of rabbits. Other forms of control such as shooting and trapping are generally only effective at controlling very small rabbit populations.

Controlling rabbit numbers can also help to reduce the number of foxes and cats in an area.



Rabbit warrens may be mechanically ripped (where possible) provided there is immediate follow up work to revegetate the ripped site. If ripping will cause too much disturbance to your conservation area or it is not possible to do without clearing vegetation, fumigation or flooding techniques may be more appropriate.



Remove old rubbish piles from your conservation area as they can become a harbour for rabbits. Other harbour such as blackberry bushes should be also be removed.



Fallen logs provide harbour for rabbits; however, they also provide important habitat for wildlife. Try not to stack timber into piles—spread the timber out. If fallen timber is causing a problem, try removing some of it rather than all of it.

Foxes and wild dogs

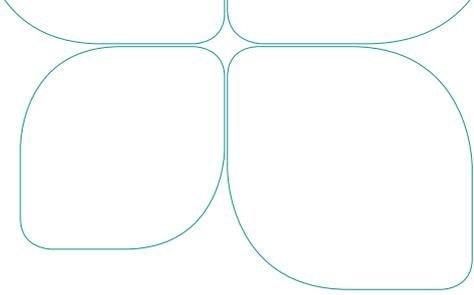
Baiting can be an effective method of reducing fox and wild dog numbers if carried out on a large scale and repeated in autumn and winter/ early spring. Using other control methods such as trapping and shooting in conjunction with baiting will further reduce fox and wild dog numbers.



Repeated, large-scale fox baiting programs are an effective method of reducing fox numbers. Photo: Hazel Watson.



Shooting may be useful as part of an integrated pest control program for foxes and wild dogs. It should not be used as a sole method of control as only a small portion of the population will be affected, with the remaining portion of the population becoming 'gun shy' and continuing to breed. Photo: Mikla Lewis.



Other feral animals

Several other feral animal species that are not declared can impact on native vegetation and wildlife, including species such as deer and cats. Limited control methods are available for these species. Deer numbers may be reduced through shooting. Control options for cats are currently limited to shooting and trapping.

Over-abundant native herbivores

Kangaroos and other 'macropods' have the potential to cause problems in conservation areas if their populations grow beyond the size that can be sustained by the landscape. Population densities can rise quickly in response to the availability of food and water. This can place pressure on conservation areas, particularly the native groundcover.

The National Parks and Wildlife Service operates a kangaroo management program to help landholders manage kangaroos in areas where they pose a problem, while also ensuring the survival of macropod species. A landholder who has a large number of kangaroos on their property may undertake a management program but must first obtain an Occupier's license (free) from the National Parks and Wildlife Service.



If kangaroo populations are degrading the quality of your conservation area, you may need to consider undertaking a kangaroo management program, with approval from the National Parks and Wildlife Service. Photo: Mikla Lewis.

Invasive plants

Environmental weeds

Weed control programs should take the following matters into consideration.

What is the cause of the weed infestation?

Often, it is pointless to try and control weeds if the cause of the problem is not addressed. Causes of weed infestations include (but are not limited to) high nutrient levels, stock or vehicles bringing weed seed in and disturbance to the soil, such as clearing, which can trigger weeds to grow.

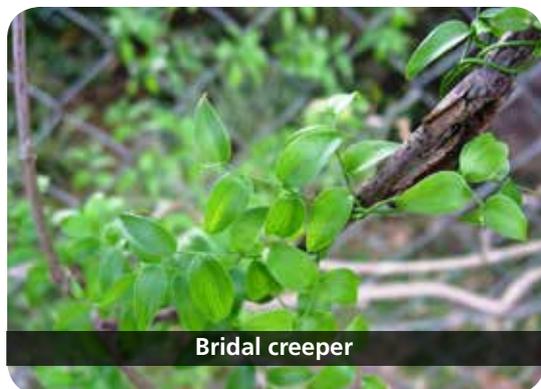
Which weed species pose the greatest threat?

Some weeds such as Weeds of National Significance (WONS) and regionally significant perennial weeds should not be ignored. The control of perennial weeds should take precedence over annual weeds.

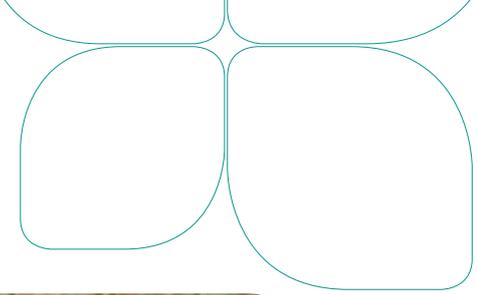
Weeds to watch for include:

WONS:

African boxthorn, blackberry, serrated tussock, bridal creeper and athel pine.



Photos: Harry Rose (second from bottom) and Craig Hunter (bottom).



Regionally significant perennials:

African lovegrass, paspalum, coolatai grass, St John's wort, sorghum sp, blue heliotrope, purple-top, khaki weed, castor-oil, swan plant, salvia sp, tobacco bush, solanum sp.



St. John's wort



Blue heliotrope



African lovegrass



Khaki weed

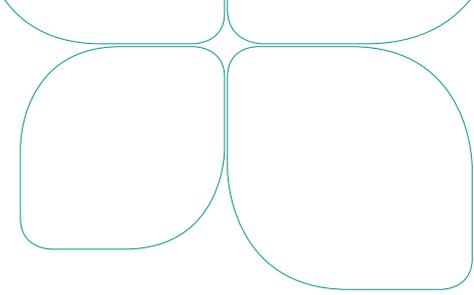


Coolatai grass



Castor-oil plant

Photos: Craig Hunter (top left), John Tann (top right) and Harry Rose (bottom left and middle right).



Annual species

Where WONS or perennial weeds are not an issue, annual weeds may still pose a significant problem and inhibit regeneration in your conservation area. Examples of annual weeds to control include saffron, sow, spear, star, variegated, St Barnaby's, scotch and other thistles, xanthium sp, wild and prickly lettuce, biddens sp, conyza sp, capeweed, brassica sp, bromus sp, wild oats, hordeum sp, lolium sp, setaria sp, vulpia sp, amaranthus sp, fumaria sp and datura sp.

The nature of the weeds

The mature size, habit, method of spread and life cycle of weeds will determine the methods of control you use and when you might undertake the control. For example, before the plants produce seed.

The density of the weed populations and how much area is affected

It is often more cost-effective to start in better areas (where the density of weeds is lower) or in areas where there are native plants growing so that they can begin to out-compete the weeds. You can then slowly work your way out from these areas and tackle the more difficult areas.

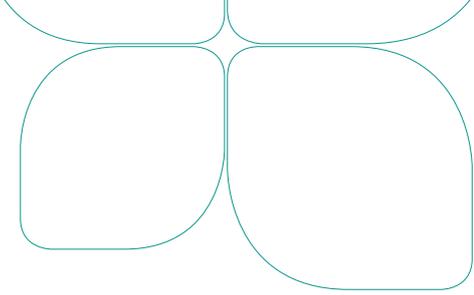
Over time, the weed seed bank will diminish and competition from native groundcover will help to prevent weeds establishing. This should significantly reduce the time, effort and resources required for weed control activities.



When weed populations are dense, weed control can be a daunting task. It may be best to tackle small areas at a time.

Are the weeds providing a useful ecological role?

Some larger weeds, such as blackberry bushes, provide ideal nesting sites for small woodland birds. In these cases, try to establish native shrub species that can replace the habitat and remove the weeds in a mosaic pattern (if possible) so that the birds are not lost.



Methods and cost of control

There are a variety of methods that can be used to control weeds, with some being highly specific to certain weed species. Commonly used methods are outlined below.

Strategic grazing

Grazing can be timed to prevent weeds seeding and to encourage native groundcover to regenerate and compete with weed species.

Herbicide

Herbicides may be applied by spraying, painting cut stumps, stem injection, frilling or stem-painting. Chemicals should be used with caution in conservation areas as they may also harm native vegetation and prevent it from regenerating.

All chemicals should be used in accordance with label instructions and relevant legislative requirements.



Spraying St. John's wort

Mechanical

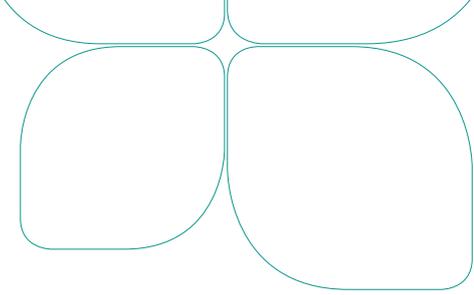
Individual weed plants can be removed by chipping or cutting. Larger machinery may be used in areas that are almost entirely covered by weeds but, in most areas, large machinery will create too much disturbance. Scalping and cultivation are not appropriate where regeneration is expected or the risk of erosion is high but can be used in adjacent weed source areas.

Biological

Biological control agents are used to control some targeted weeds, under restricted conditions. Talk to your Local Land Services Officer to find out about biological control agents that may be used in your area.



Biological control agents being released on a travelling stock route near Grenfell.



Preventing new weed incursions

Some key concepts for preventing new weed incursions include:

- avoid disturbance to the ground layer such as overgrazing, earthworks and ploughing as weeds can quickly colonise bare patches or areas where there is poor competition from native plants
- be careful with chemical applications to minimise the damage to regenerating native plants so they can compete with weeds
- weeds love nutrient rich areas so avoid fertilising and do not leave stock in long enough for them to establish stock camps
- be mindful that when stock or vehicles enter the conservation area they have the potential to bring in weed seeds
- encourage native cover through appropriate grazing regimes.

Invasive native scrub

Otherwise known as 'woody weeds' Invasive Native Scrub (INS) includes native plants that have either regenerated profusely following disturbance or invaded vegetation communities where they previously didn't occur.



White cypress pine acting invasively in a grey box woodland.

Preventing INS

Prevention of INS is definitely better than trying to cure it. If there are currently no problems with invasive native plants in your conservation area, the following steps should be taken to keep it that way.

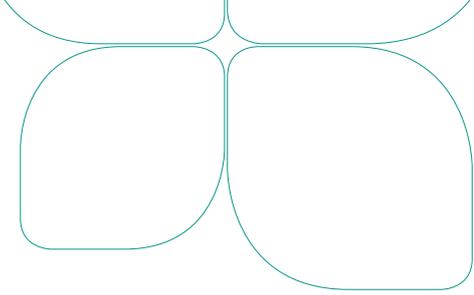
- Manage total grazing pressure to encourage vigorous growth of perennial native groundcover, which can suppress shrub seedlings. This is particularly important when seasonal conditions may favour the establishment of INS species, such as subsequent wet summers.
- Minimise disturbances such as unnecessary clearing for tracks or fence lines, which can create an ideal environment (bare soil) for the establishment of INS species.
- Monitor your conservation area for signs of invasion and respond promptly.

INS management

Successful INS management requires an integrated approach. Initially, invasive plants need to be cleared, which may involve the use of fire, individual treatments (chemical spot treatment, ringbarking or grubbing) or paddock-scale treatments (chaining, slashing, stick raking, blade ploughing or mulching).



Paddock-scale treatments and equipment used to control INS.



Clearing of INS must be followed up with other management such as groundcover establishment, appropriate grazing management, monitoring and even follow up clearing to remove new INS growth.



Appropriate grazing management will ensure that groundcover levels are maintained to prevent INS from establishing.

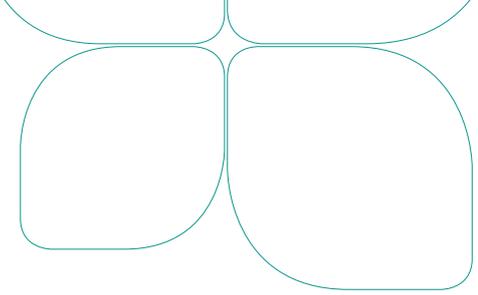


The aim of any INS treatment within conservation areas should be to open up the woodland area again and create structural diversity and species diversity, with a sustainable number of overstorey and understorey plants and good native groundcover.



Specialist advice and approval may be required from your Local Land Services Officer before treating INS issues.

INS is native vegetation so any clearing must be conducted in accordance with relevant legislation. Please talk to your Local Land Services Officer prior to commencing any INS management on your property.



Mistletoe management

Eradication of mistletoe is neither possible nor desirable, given the plant's important ecological role. However, there are some options for management, where infestations are threatening the survival of other native vegetation.



Mistletoes are a natural component of Australian landscapes that play an important ecological role by providing food and shelter for a variety of native animals. Excessive infestations of mistletoes are a symptom of a wider problem and system out of balance due to land clearing, intensive land use and habitat destruction.

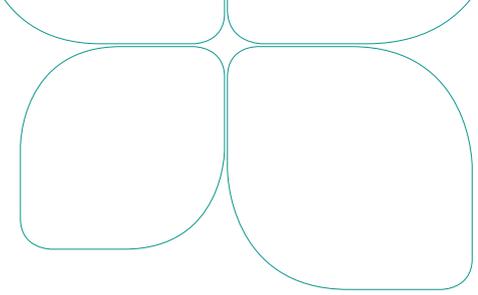
Short-term options

Lopping tree branches containing mistletoes and pruning or chemically injecting individual mistletoe plants can be effective ways of controlling outbreaks on a localised scale. However, these are labour intensive operations, given that a mature eucalypt can support over 200 individual mistletoe plants, and would not be economical on a large-scale.



Mature eucalypts can support a large number of mistletoes. Photo: Mikla Lewis.

Mistletoes are native plant species so relevant legislation regarding the clearing of native vegetation must be considered if you plan to remove or kill mistletoes.



Long-term options

Promoting natural control agents and native vegetation regeneration is a more economically and environmentally sustainable option for managing mistletoe infestations.

Control agents include animals such as possums, gliders, parrots and insects, which can be encouraged through the restoration and maintenance of suitable habitat such as understory shrubs, groundcover and tree hollows.

Allow for sufficient regeneration of native trees and shrubs to replace tree losses resulting from mistletoe infestation.

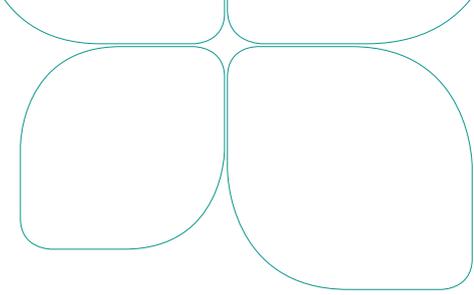


Superb parrot in grey mistletoe



Mistletoe bird in box mistletoe

Possums and parrots are destructive feeders (destroying the mistletoe foliage and fruit), while honeyeaters and mistletoe birds are cooperative feeders, pollinating and spreading the seed. Photos: George Chapman (top) and Friends of Aldinga Scrub (bottom).



Encouraging regeneration and plant diversity

Overgrazing and invasive plants are often the main factors that inhibit regeneration. Once you have fenced the conservation area and controlled grazing animals as well as any immediate weed or pest animal threats, regeneration of native plants may occur with very little effort.

If no regeneration occurs after a period of three to five years, you may need to apply some of the following techniques to help 'trigger' regeneration.

Strategically graze the area

You need to manage grazing of the area to allow new plants to germinate, establish and regenerate. Letting stock in too early or leaving stock in for too long may mean overstorey and understorey seedlings are eaten off before they get a

chance to establish. Grazing at the wrong time may mean native groundcovers don't get a chance to flower and seed.

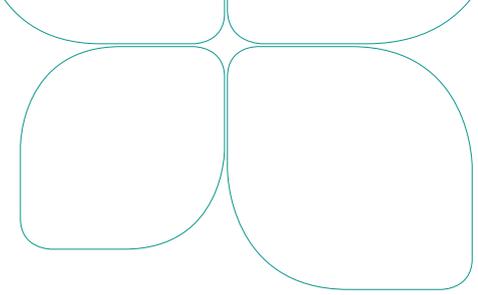
If the total grazing pressure is too great, you may need to ramp up your pest control program, temporarily exclude stock and consider reducing the kangaroo population.

Reduce competition

Plants may not be regenerating due to competition for resources. Careful, targeted use of herbicides to control weeds can encourage regeneration of native plants.

For some vegetation types, ecological thinning may be required where regeneration is thick. Likewise, if INS is an issue, you will need to manage this before you start to see any regeneration.

Native vegetation legislation must be considered when clearing or thinning any native vegetation. Please talk to your Local Land Services Officer prior to commencing any management activities that involve clearing native vegetation.



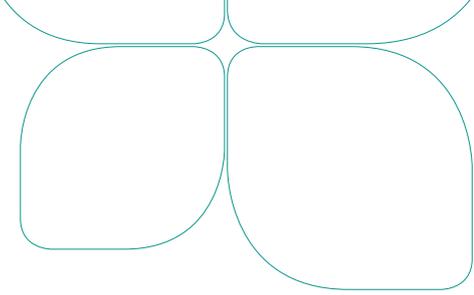
This dense regrowth of Blakely's red gum may inhibit the development of an understorey. Ecological thinning may be necessary to encourage plant diversity.



Clearing INS will reduce the competition for sunlight and other resources, allowing other native plants to regenerate.



Without grazing, this native grass has grown tall and dominates the ground layer, suppressing the growth of other plants. High-intensity (using a large number of animals), short-duration grazing will help to reduce the bulk of this dominant grass and allow new plants to come through.



Improve the soil conditions

Sites that have been subject to heavy vehicles or stock in the past may have soil compaction issues. Allowing leaf litter and debris to accumulate will improve the soil surface conditions, encourage soil fauna and provide a more suitable environment for seeds to germinate.

In general, native plants do not like elevated levels of phosphorus. Sites that have been fertilised in the past or have had high numbers of stock for long periods of time may take a long time to naturally regenerate. Prevent further enrichment by excluding stock and the use of fertilisers.

Revegetation may be an option if regeneration still does not occur. Planting pioneer species such as wattles will help to improve the soil for other plants to follow.



Leaf litter protects the soil surface and provides food for soil fauna that, in turn, improve the soil structure and fertility. Photo: Mikla Lewis.

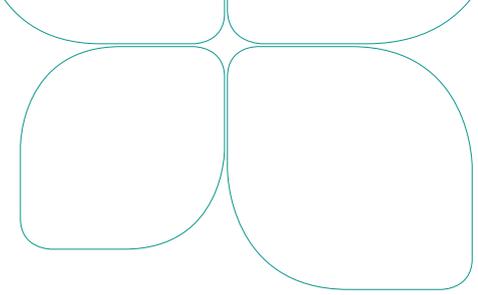
Disturbance

In some cases, a small level of disturbance may be required to trigger germination, provide opportunities for new plants to colonise or to address soil compaction. Disturbance may be achieved mechanically (raking, scarifying or even cultivation in severe cases) or through the use of animals.

Be mindful that any disturbance may expose a site to erosion and also trigger weeds or INS to grow. Limit the disturbance, put erosion control measures in place and follow it up with weed control, where necessary.



Invasive native scrub has affected this site and the soil has become crusted on the surface. Slight mechanical disturbance to the soil surface will help trigger regeneration to occur.



Controlled burning

Some native plants need the heat or smoke from fire to germinate. The best way to do this is through small, prescribed burns that are conducted in a mosaic pattern, which allows patches to remain unburnt for periods of 10–15 years. Approvals may be required to undertake these types of burns, particularly if native vegetation will be affected.



A low intensity burn to improve understorey species diversity.

When all else fails..... revegetate

Where regeneration is not occurring, planting or direct seeding of native trees, shrubs and groundcovers may be required to introduce new growth. Direct seeding methods may be more cost-effective and suitable for conservation areas. This can include bush matting (laying seed bearing branches), transferring soil and leaf litter, hand broadcasting seed or sowing seed with a direct seeding machine.



Revegetation may be necessary for barren sites where regeneration does not occur naturally over time.

Stabilising land degradation issues

Addressing existing problems

Erosion

The extent and cost of the works required to fix erosion issues within your conservation area will depend on the severity of the problem and the factors that have caused the erosion.

Large, actively eroding gullies will require urgent attention to stabilise the gully 'head', which may involve earthworks designed and constructed by an expert. This may become quite costly but will be necessary in order to prevent the problem from worsening. In other cases, where the erosion is small and isolated, it may be possible to halt the erosion simply by excluding stock and encouraging groundcover to establish.

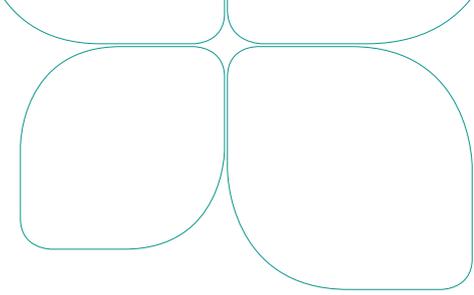
Stock should be excluded from any site where there is active erosion. Perennial groundcover needs to be established to stabilise the site. Regeneration of other vegetation will provide further stability. Stock may be re-introduced to the site once the site has been rehabilitated but should be carefully managed to avoid new problems arising.



This site will require extensive works to reclaim the area, including control of invasive native scrub, which is likely to have caused the problem in the first place.



This site has been overgrazed. While the erosion is 'active', it is isolated and small. Simply excluding stock and allowing groundcover to establish may be all that is required to fix the problem.



Salinity

Salinity issues are best addressed on a catchment scale. Use of perennial plant species and revegetation in 'recharge' areas or as interception plantings, will help to lower the watertable.

If there is a discharge site within your conservation area, prevent stock from accessing the area as stock can congregate to lick the salt and may cause erosion. You may need to rehabilitate scalded sites by encouraging or planting perennial, salt-tolerant plants (see the Local Land Services guide 'Planting your patch' for a list of salt-tolerant plant species).



This severely scalded and eroded site will require extensive rehabilitation works at a catchment scale to address salinity issues and reclaim the site. This may include strategic revegetation, earthworks and grazing management.

Water quality

To address water quality issues such as sedimentation and eutrophication in water bodies, efforts need to be concentrated on the surrounding land and riparian area (land adjacent to the water body). Stock access to the water body should also be controlled to avoid trampling and damage to the stream bed and banks. Pest animals that like to be around water, such as feral pigs, should be managed as they too can cause damage.

Actions may include:

- limiting the use of chemicals and fertilisers on adjacent agricultural land
- using conservation farming and grazing techniques to minimise surface run-off from cropping and grazing land
- addressing gully and streambank erosion
- managing or creating 'buffers' of vegetation to help filter nutrients and sediment before it enters the waterway
- controlling invasive pest species
- fencing off the water body to limit stock access. This may also require the installation of alternative watering points, such as troughs, for stock.

Preventing land degradation

The best way to prevent land degradation is to manage land according to its capability. For example, if your site is situated on a steep slope with shallow soil the erosion hazard will be high and it may be too fragile for grazing.

Likewise, vary your management according to seasonal conditions. Stock access may need to be further restricted during times of drought to preserve groundcover or when it is very wet to prevent bogging up the area.

Even when conditions are good and the land is capable of supporting grazing animals the following principles should be applied.

- Don't overgraze the area and allow native, perennial groundcover to establish.
- Control weeds, pest animals and INS.
- Encourage regeneration of native vegetation.



Vegetation has been restored around this wetland area to help filter sediment and nutrients from the surrounding landscape. Photo: Mikla Lewis.



Fencing off creeks and other water bodies can help to improve the groundcover within the riparian zone, which will help to filter sediments and nutrients before they enter the waterway.



Riparian land is sensitive land and should be managed accordingly. This site has been overgrazed, with the result being a highly eroded waterway full of sediment. To prevent further sedimentation of this waterway, action needs to be taken to control stock access, address streambank erosion and improve the groundcover on the adjacent grazing land. Photo: Mikla Lewis.

Restoring other habitat features

Where habitat features are lacking, you may need to intervene if you want wildlife to begin using your conservation area.

This could involve:

- moving fallen timber or other habitat features from other areas where they are a problem, for example cropping paddocks
- providing artificial habitat such as nest boxes, specifically designed to attract certain species
- revegetation, particularly of the understorey.



Squirrel gliders

These nest boxes have been specifically designed to provide habitat for small gliders, such as squirrel gliders. Photos: John Turbill/ OEH (top) and Mikla Lewis (bottom).

Managing Aboriginal cultural heritage

Aboriginal communities are interested in sharing cultural knowledge and protecting cultural sites together with landholders, in the best possible way.

Having culturally significant sites on your property will not affect ownership, does not give people automatic access to sites without permission and, in the majority of cases, will not prevent existing land use practices from continuing.

If you have cultural sites or objects of significance on your land, there is information and people around to help you protect them. To find out the most appropriate way to preserve Aboriginal sites or objects on your property contact your Local Land Services office. A Local Land Services Aboriginal Communities Officer can offer advice and connect you with appropriate organisations.



A Local Land Services Aboriginal Communities Officer can visit your property to help you identify Aboriginal heritage sites and offer advice as to how best to protect them.

Aboriginal sites and objects should be protected and managed in consultation with the local Aboriginal community.

In NSW, the protection and preservation of Aboriginal objects and places falls within the National Parks and Wildlife Act (NPW) 1974. It is an offence to harm (destroy, deface or damage) an Aboriginal object or Aboriginal Place or move an Aboriginal object from the land on which it has been situated.



Monitoring

Monitoring

Regular monitoring of the conservation areas on your property will help you to evaluate if your management activities are having the desired effect. It will also help you to quickly notice changes and signs of pressure, such as new incursions of weeds or pest animals, so that you can adjust your management.



All sites, regardless of their condition, should be regularly monitored to identify threats and changes in condition. Photo: Mikla Lewis.

There are lots of ways to monitor. Four simple and effective methods for monitoring the health of your habitat are outlined in this section. These include:

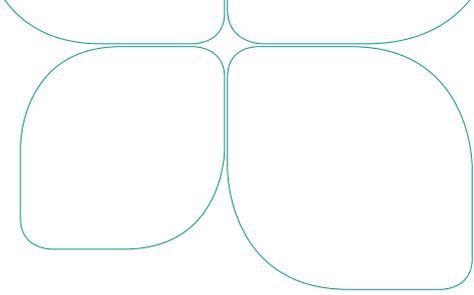
- a permanent photo-point
- step-point monitoring (along a 100m line)
- a site search (conducted over a 50m x 20m plot)
- incidental observations.

You may choose to only undertake some of the suggested monitoring or focus on a specific aspect; however, the more information you collect about your site, the more informed your management decisions will be.

Further information on your site may be gained by having an expert undertake a vegetation or fauna survey.



Inviting an expert to conduct flora and fauna surveys will provide you with a comprehensive list of plant and animals species for your conservation area. Photo: Mikla Lewis.



Site selection

Select a monitoring site that is representative of the overall habitat area and not biased to small patches of densely vegetated areas, or at the other extreme, patches of bare ground. The monitoring site should remain constant so that comparisons can be made over time.

Habitat across your property can vary significantly so it is a good idea to undertake separate monitoring for separate areas. If your patch is large (>10ha) or contains several distinctly different vegetation types, it may also be a good idea to have more than one monitoring site.



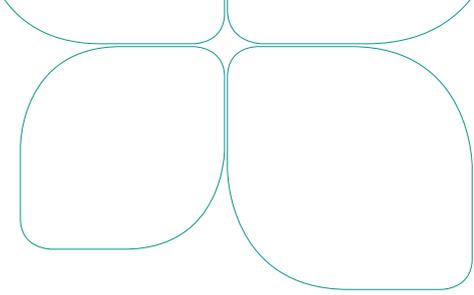
Your monitoring site should reflect the average composition of the entire area. Photo: Mikla Lewis.

When to monitor

The best time of year to monitor is towards the end of autumn or spring as plants are much easier to recognise when they have flowers or seeds heads. Take your measurements and photographs at approximately the same time each year to minimise variations in the information you collect due to seasonal changes in plant growth.



Monitoring when plants are in flower can make it easier to identify them correctly. Photo: Mikla Lewis.



How to monitor

Select your monitoring site and set up a 50m x 20m plot, and a 100m step-point line (as shown in figure 1), by pacing it out or using a measuring tape.



Measuring out a monitoring site.

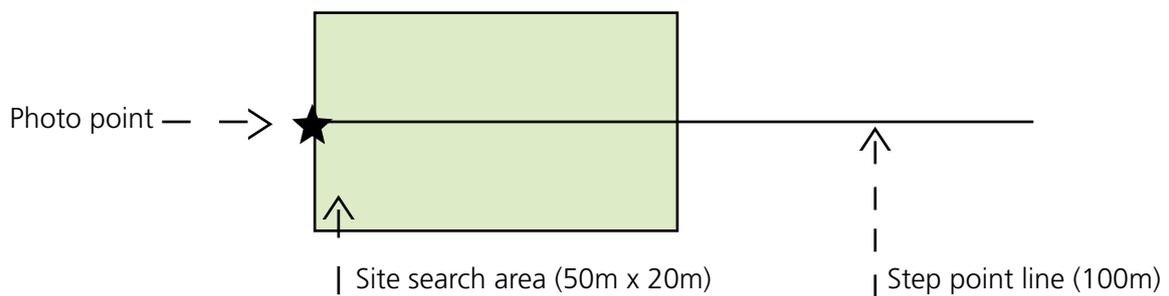


Figure 1: Setting up your monitoring site. The corners of the plot should be marked (with stakes or flags). A permanent post should be driven into the ground at the photo point.

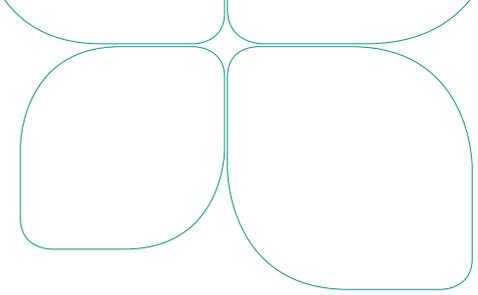


Photo points

Keeping a photographic record of your project area is the simplest way of monitoring it. A permanent photo-point allows you to take your photo from the same spot overtime so that you can compare photos from year-to-year or season-to-season to see changes.

1. Mark the photo site by hammering a post into the ground.



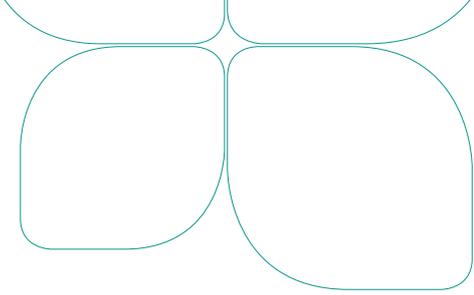
2. Select a setting on your camera that best allows you to capture the landscape. Make sure you use the same zoom level every time a photograph is taken, otherwise your photos will contain different objects. Take copies of the photos from your previous monitoring to ensure a similar field of view.



3. Stand at the photo-point post, frame your scene in your camera viewfinder and then take four landscape photos at 12 o'clock, 3 o'clock, 6 o'clock and 9 o'clock (or north, east, south and west).



4. When you print or save your photographs, make sure you file them with other monitoring data you collected on the same day.



Step-point monitoring

While photo points are the simplest method of recording changes in vegetation over time, they do not provide information about the type of plants growing, how many plants there are or how much groundcover they provide. The simplest method of providing more detailed information about the groundcover vegetation is by step-point monitoring.

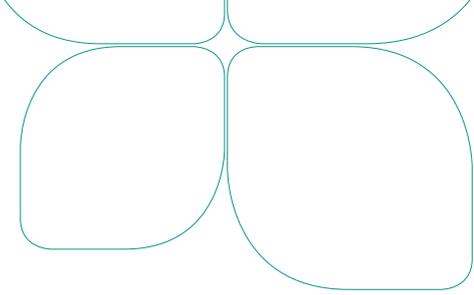
- Start at the photo point post along the 100m step-point line of your monitoring plot. Begin walking along the step-point line, making sure you look ahead, not at the ground. Otherwise, you will bias the results and may walk into something!
- Stop after you take each step, observe and record whatever falls directly at the tip of your boot. A recording sheet is provided in the

Appendix for you to record your findings. Recoding for this method is as simple as putting a 'tally' mark in one of the following categories:

- native annual
 - native perennial
 - exotic annual
 - exotic perennial
 - litter (fallen leaves, dead plants, twigs)
 - bare ground
 - other.
- When you have completed your 100 steps, add the tally for each column and record this as the total (this is also the percentage).



Only record the plant that is in contact with the soil at the tip of your boot. You may like to make a mark on your boot so that you do not bias the result by looking at a different spot each time.



Site search

A site search is a useful way of getting more specific information about the condition of your site and builds on what you may have observed through changes in your photo-points over time.



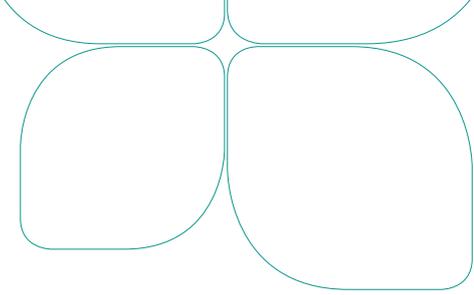
A site search can reveal a lot about the state of your conservation area. Photo: Mikla Lewis.

To conduct the site search, systematically walk through the 50m x 20m plot and record the following (a recording sheet is provided in the Appendix).

Regeneration: in this instance, regeneration refers to any native tree or shrub species that has grown naturally. More than one species may be regenerating so be sure to record the number of species regenerating within the plot as well as the number of individual plants.

Hollows: Search trees for hollows with an opening that is greater than 5cm. Some trees may have more than one hollow. Record both the number of trees with hollows as well as the total number of hollows over the search area.





Fallen timber: Estimate the amount or density of fallen timber and record it as either 'none', 'some' or 'lots'. Only include timber with an average diameter greater than 10cm.



No fallen timber



Some fallen timber



Lots of fallen timber

Dieback: Look in mature trees for signs of dieback. Record the number of trees within the search area that show signs of dieback as per the categories shown in figure 2.

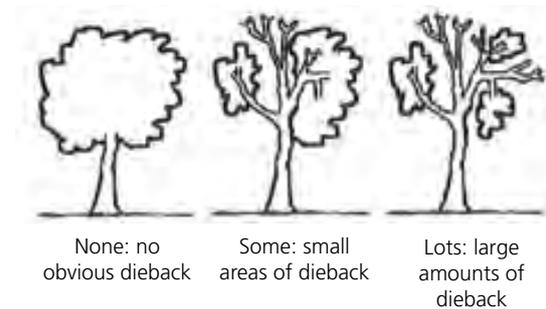


Figure 2: Categories of tree dieback.
Credit: Jenny Stott, Australian National University.

Mistletoe: Search mature trees within the plot for mistletoes. Record the number of trees within the search area that show signs of mistletoe infestation as per the categories shown in figure 3.

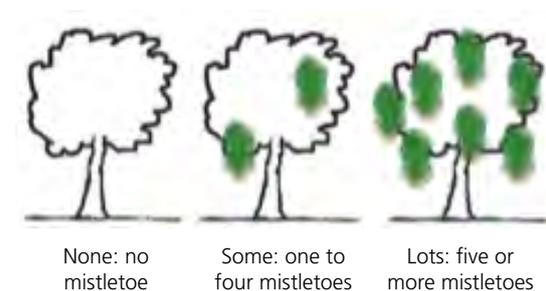
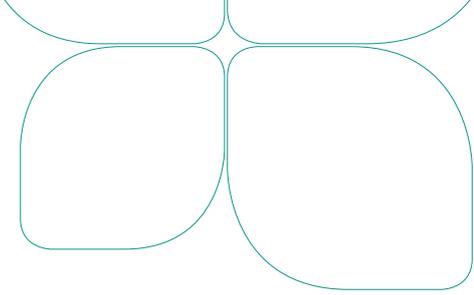


Figure 3: Categories of mistletoe infestation.
Credit: Jenny Stott, Australian National University



Other things to record

Incidental observations

Record any other incidental observations for your habitat area (at any time of the year, over the entire habitat area) as these will add to the information and knowledge you have about it. This might include information such as native birds or other animals you see using the area, general plant health, sightings of pest animals and land degradation symptoms.



Grey shrike-thrush



Eastern water dragon

Record opportunistic sightings of animals, especially if you haven't seen them in your conservation area before!

There is space provided on the recording sheets in the Appendix to record any incidental observations. Some helpful plant and animal identification guides are provided in the references listed at the back of this guide.

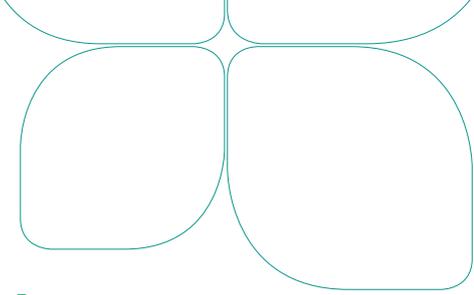
Site history

It is a good idea to also include some detail in your records about the seasonal conditions, natural events, such as a fire or flood, and what management activities you have carried out within your habitat area since you last monitored.

These activities can influence the health of your conservation area and may help to explain changes you observe during monitoring. There is space provided on the recording sheets in the Appendix to record these things.



Appendix



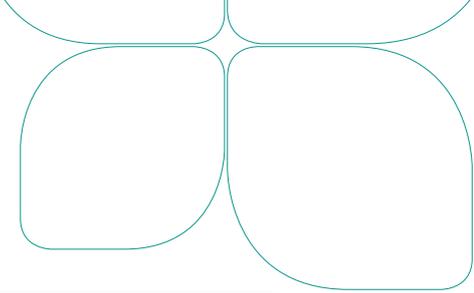
Recording sheets for monitoring

SITE DETAILS			
Date		Recorder	
Site name			
Seasonal conditions	<input type="checkbox"/> Poor	<input type="checkbox"/> Fair	<input type="checkbox"/> Good <input type="checkbox"/> Excellent
Photos taken	<input type="checkbox"/> Yes	Photo numbers:	

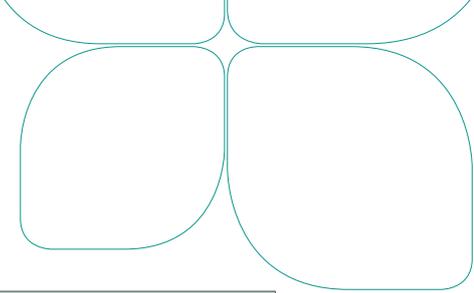
MANAGEMENT ACTIONS (SINCE LAST MONITORING EVENT)				
Stock grazing	Type of stock	Number	Duration	Time of year
	Comments:			
Invasive plant management	Type of weed/plant	Area of infestation	Area treated	
	Comments:			
Invasive animal management	Type of pest	Estimated number eradicated	Control method	
	Comments:			
Revegetation	Number of plants	Area planted	Method of planting	
	Comments:			
Other activities	<input type="checkbox"/> Fencing	<input type="checkbox"/> Erosion control	<input type="checkbox"/> Firewood collection	<input type="checkbox"/> Other
	Comments:			
Natural events	<input type="checkbox"/> Fire	<input type="checkbox"/> Flood	<input type="checkbox"/> Drought	<input type="checkbox"/> Windstorm
	Comments:			

STEP-POINT MONITORING (100 METRES)

Date	Recorder						
Site name							
Step number	Native annual	Native perennial	Exotic annual	Exotic perennial	Litter <small>(fallen leaves, dead plants, twigs)</small>	Bare ground	Other
1							
2							
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6							
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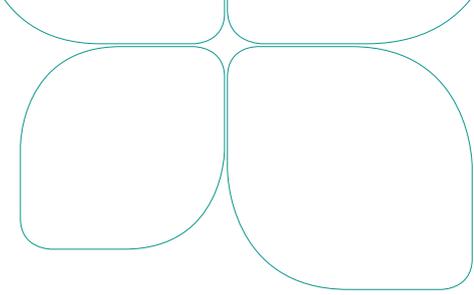


STEP-POINT MONITORING (100 METRES)							
Step number	Native annual	Native perennial	Exotic annual	Exotic perennial	Litter <small>(fallen leaves, dead plants, twigs)</small>	Bare ground	Other
51							
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98							
99							
100							
Total							



SITE SEARCH			
Date		Recorder	
Site name			
Regeneration (native trees and shrubs)	Yes/ No	Number of species	Number of plants
	Comments:		
Hollows	Number of trees with hollows	Number of hollows in total	Estimated average size of hollows
	Comments:		
Fallen timber	None	Some	Lots
	Comments:		
Dieback	Number of trees with NO dieback	Number of trees with SOME dieback	Number of trees with LOTS of dieback
	Comments:		
Mistletoe	Number of trees with NO mistletoe	Number of trees with SOME mistletoe	Number of trees with LOTS of mistletoe
	Comments:		

INCIDENTAL OBSERVATIONS		
Date	Recorder	Observation



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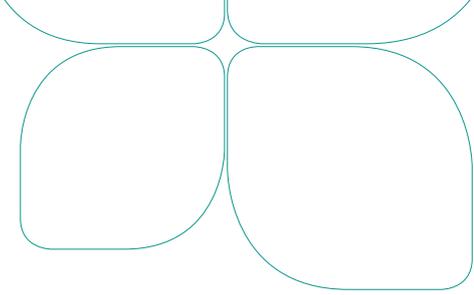
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Further reading

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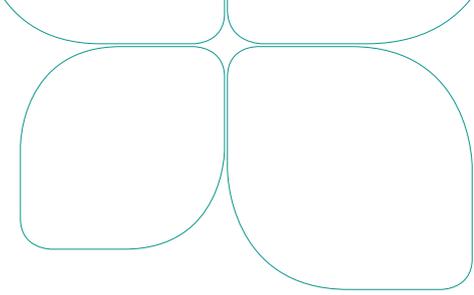
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